Report Title:

PHASE II CALDERON PROCESS TO PRODUCE DIRECT REDUCED IRON RESEARCH AND DEVELOPMENT PROJECT

Report Type: QUARTERLY | Reporting Period Start Date: 04/01/2003 End Date: 06/30/2003

Principal Author(s): ALBERT CALDERON

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Submitting Organization(s)

Name & Address

CALDERON ENERGY COMPANY
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P.O. Box 126
Bowling Green, OH 43402

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DISCLAIMER

QUARTERLY TECHNICAL PROGRESS REPORT

PHASE II CALDERON PROCESS TO PRODUCE DIRECT REDUCED IRON RESEARCH AND DEVELOPMENT PROJECT

CALDERON ENERGY COMPANY
COOPERATIVE AGREEMENT NO. DE-FC22-95PC92638

Reporting Period: 4-01-03 to 6-30-03

Date of Report: 7-24-03;

Phase II Award Date: 6-23-00; Anticipated Completion Date: 12-03-04

Total Project: $ 14,732,316.00 Total DOE Share This Action: $6,457,000.00

Contracting Officer's Representative (COR): Carl Maronde;

Project Director: Albert Calderon

Assistant Project Director: Reina Calderon

Abstract

This project was initially targeted to the making of coke for blast furnaces by using proprietary technology of Calderon in a phased approach, and Phase I was successfully completed. The project was then re-directed to the making of iron units. U.S. Steel teamed up with Calderon for a joint effort which will last 42 months to produce directly reduced iron with the potential of converting it into molten iron or steel consistent with the Roadmap recommendations of 1998 prepared by the Steel Industry in cooperation with the Department of Energy.

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Executive Summary

The commercialization path of the Calderon technology for making a feedstock for steelmaking with assistance from DOE initially focused on making coke and work was done which proved that the Calderon technology is capable of making good coke for hard driving blast furnaces. U.S. Steel which participated in such demonstration felt that the Calderon technology would be more meaningful in lowering the costs of making steel by adapting it to the making of iron - thus obviating the need for coke.

The fact that U.S. Steel and Calderon teamed up to jointly work together to demonstrate that the Calderon technology will produce in a closed system iron units from iron concentrate (ore) and coal competitively by eliminating pelletizing, sintering, coking, blast furnace operation and possibly doing away with the BOF and the EAF by making steel directly, a huge reduction in CO_2 generation relating to steelmaking would ensue. Such reduction will restructure the steel industry away from the very energy-intensive steelmaking steps currently practiced and drastically reduce costs.

As the tariffs imposed on steel imports will cease by 2005, the development of a technology to lower U.S. steelmaking costs and become globally competitive is a priority of major importance. Therefore, the development work which Calderon is conducting presently under this Agreement with the U.S. Department of Energy becomes more crucial than ever.

Experimental

In the “Conclusion” section of the last quarterly report (page 11), it was stated as follows: “During the next quarter intensive efforts will continue to be applied in order to

completely overcome the sticking problem which would lead to the achievement of the 72-hour run at a reasonably steady state with a metallization of 80%."

During the past quarter fourteen runs were conducted; namely, Run 112 to Run 126 inclusive of which Run 116 consisted of the 72-hour test. The entire run lasted in excess of 91 hours of which the first 18-1/2 hours were used to attain steady state. The cycled drums to the reactor were marked as follows: "X", "Y", "A", "B", "C", "D", "E", "F", "G", "H", "I", "J", "K", "L", "M" and "N". The cycled drums were fully lined with insulation and refractory material to minimize heat loss. The major problems related to sticking and refractories were solved. The 72 hour test which was conducted in the week of April 28, averaged a metallization of 72.3%, 90% of the 80% metallization goal. The highest metallization attained to-date is 77.5%

The procedure for the collection of the processed material was to dump the contents of cycled drums into unlined drums for shipment to U.S. Steel for evaluation. The product of drum "X", "Y", and "A" which consisted of the material produced (pre-steady state) to reach steady state was not shipped to U.S. Steel for fear of inadvertently getting mixed with the steady state product. The contents of cycled drums "B, C & D"; "E, F & G"; "H, I & J"; and "K, L, M & N" were transferred into four unlined drums and marked for shipment to U.S. Steel Research as drum BCD; drum EFG; drum HIJ; and drum KLMN. The total weight of the product for testing at U.S. Steel contained in the four drums was 1808 lbs. According to U.S. Steel Research, the weight of the product was divided as follows: 230.71 lbs (12.76%) marked as uncrushable; 534.79 lbs (29.57%) marked as +1/4"; and 1043.14 (57.68%) marked as -1/4".

From a previous chemistry test done by U.S. Steel on uncrushable product the metallization was found to be 95.60%, with "Carbon" being at 0.022% and "Sulfur" at 0.514%.

In the composite analyses of +1/4", the percent metallization was 75.63% and in the composite analyses of -1/4", the percent metallization was 61.90%. The overall metallization for the entire product (drum “B” through drum “N”) resulted at 72.3%; see attached Exhibit 1(a), 1(b) and 1(c).

Results and Discussion

The results of the tests were submitted by U.S. Steel to Calderon on June 3rd and two meetings were arranged with U.S. Steel for the 10th of June at the Monroeville Research Center. The first meeting was to discuss the overall program and the conceptual approach to the next step beyond the current budget period. The second meeting was to discuss the details of the 72 hour test and the next step(s) to be taken towards attaining 80% minimum metallization including the performance of a mass balance.

The first meeting was attended by the Vice President of Research, the Director of Research, and the Assistant Director of Research, of U.S. Steel and a team of four from Calderon. Calderon displayed a scale model which conceptually showed the Calderon Technology as applied for making steel using ore concentrate and coal with the potential of drastically reducing capital and operating expenses; see photograph #1. The conclusion of this first meeting was that 80% metallization be achieved and a mass balance completed as soon as practical. The Director also offered technical assistance to achieve this.

The second meeting which was attended by the Director of Research and four personnel of U.S. Steel Research who have been intimately involved in the project, focused on details as to what has been achieved to-date, and what needs to be done in order to achieve 80% metallization and a mass balance. The conclusion of this second meeting led to the following tasks:

Task 1 - Conduct tests with high volatile coal

Task 2 - Take steps to eliminate the drum changes at the reactor in order to prevent fluctuations of temperature during the steady state operation.

Task 3 - Conduct a test of 72 hours @ 80% metallization with two additional tests at 80% metallization to verify repeatability.

Task 4 - Performing a mass balance.

A recommendation was made that no funds should be spent on size increase of the reactor until the above four tasks are successfully concluded.

Task 1 - Conduct Tests with High Volatile Coal

Since the beginning of the project, the ore feed (see Exhibit 2) has been constant whereas the coal used has been a left-over (scrap coal) from quality control tests conducted by UEC (U.S. Steel's coal testing laboratory) on samples taken from coal blends used at U.S. Steel's coke plants. Analysis of these "scrap coals" samples were consistently submitted by U.S. Steel's Technical Center to Calderon. These scrap samples generally were of mid-volatile composition such as the one labeled #24 dated 3-24-03 (Exhibit #3) which was used in the 72 hour test of April 28, 2003.

In as much as the focus of the work for the past two years has been as a priority, to develop a practice to overcome pushing problems because of sticking, mechanical de-bugging and selection of the right refractory, no effort was expended on the selection of suitable coal(s) for this novel process. "Scrap coal" from UEC was accepted without questioning its suitability.

From the results obtained to date there is an indication that there is too much carbon left over with the product, and reduction of the ore is inadequate in order to achieve 80%

minimum metallization. Since the problems of sticking (pushing) and refractories have been solved and 90% of the metallization goal achieved, it was decided to examine the suitability of the coal for the process. Logic concluded that an increase in volatility in the coal would be the right direction to follow inclusive of a coal with higher reactivity as compared to the coal blends (scrap coals) for making metallurgical coke heretofore used. Calderon requested from U.S. Steel Research to investigate the supply of high volatile coal to enable Calderon to conduct tests for suitability. U.S. Steel agreed to look into the matter.

In the meantime as a start, Calderon recoursed to a high sulfur steam coal used in 1992 in its gasification work (see Exhibit 4a and 4b). This coal was tested but found to be excessively re-active leading towards cave-ins in the core of the reactor. On May 12, Calderon received notice (Exhibit 5) from U.S. Steel Research stating that it had located a high volatile, high sulfur coal (37% to 39% VM) called “Maple Creek” which we could be tried until they located a high volatile, low sulfur coal. Two test were conducted with Maple Creek; it was a disaster. Despite the high volatility, the coal was very unreactive leading to excessive coke formation in the product and high pushing problems leading to aborted runs. On June 13, Calderon received a second notice (Exhibit 6) from U.S. Steel to the effect that a high volatile, low sulfur coal was located at Gary, the coal being identified as “Premier Elkhorn”. Calderon instructed U.S. Steel to ship 20 tons of Elkhorn to its facility in Alliance, Ohio for storage from which coal would be withdrawn, and Calderon informed U.S. Steel that Calderon would take care of the crushing. The Elkhorn coal was tested in part of run 126 (drum C through drum H inclusive), starting at 7:00 a.m. on the 25th of June to 5:12 p.m. on the 26th, a period of 34 hours:12 minutes. The pushing pressures were manageable and the product as determined by grindability indicated that it was highly metallized, but not uniform.

The plan is to concentrate in the use of Elkhorn since U.S. Steel can supply a coal that has promise dependably. Effort will be made to develop a practice for its use with the goal of yielding a minimum metallization of 80%.

For quite sometime it has been recognized that drum change is detrimental to product uniformity by virtue of severe heat loss during drum change especially at the reactor discharge. The heat loss is of such magnitude that despite high temperature of drum preheat prior to the change, it takes between 2-1/2 hours to 3-1/2 hours to recover. In the meantime the product at the end of the reactor would tend to freeze resulting in excessive pushing pressures which in turn disturb the uniform advance of the material within the reactor. Such disturbance causes material to be static within the reactor leading to overheating and even melting of the ore or the product made from the ore.

Task 2 - Steps to Eliminate Drum Change

To replace the drums, a vibrating feeder which is refractory lined has been designed and an order placed with the Webster Company of Tiffin, Ohio, to fabricate such feeder. Vibrating feeders for high temperature are used in the handling of hot bottom ash from boilers (see Exhibit 7). The feeder is to be delivered by mid-August 2003. It is estimated that it would take about 30 additional days to make the feeder operable while it is outfitted with refractories and a hood, and connected to the elbow of the reactor. The plan is to start testing again in the second half of September.

Task 3 - Conduct a Test of 72 hours @ 80% Metallization with Repeatability

As soon as the new change is in place and de-bugged, runs will be conducted towards the achievement of the 72 hours at reasonably continuous steady state with a metallization

of 80% minimum. Once that stage is reached, repeatable tests will be conducted in order to build confidence in the process.

Task 4 - Performing a Mass Balance

This task will be conduced by U.S. Steel following a procedure which will be set by U.S. Steel Research.

Other Activities

During the testing of the product produced in the 72 hour tests and the performance of the mass balance, Calderon will do work in connection with the integration of the process to a melter (arc furnace) which was recently acquired from the research department of the former Electromelt Furnace Co., a major builder of electric arc furnaces for the steel industry. This furnace which was used as a research tool by Electromelt was purchased for about one-tenth of the cost of a new one.

Conclusion

The results produced to-date (90% of the metallization goal) is very encouraging. With additional effort there is no reason of not reaching the goal set by U.S. Steel, namely attaining a minimum of 80% metallization. The extension of the contract to December 2004 by NETL, at no additional cost to the Government, is appreciated. This extension will enable Calderon with technical support from U.S. Steel, to develop the much needed process to reduce the cost of making iron or steel by making use of ore concentrate and coal.

References - Not Applicable

The work performed in this quarter was original work. No reference material was found or relied upon for the work

Submitted by:

Albert Calderon
Project Director

EXHIBITS

Exhibit 1:-	Tables 1(a) thru 1(c) showing numerical values of material produced during 72 hour test
Photograph #1:-	Conceptual scale model of future commercial plant
Exhibit 2:-	Analysis of iron ore used
Exhibit 3:-	Analysis of scrap coal from U.S. Steel Laboratory
Exhibit 4(a):-	High Volatile Matter Steam Coal
Exhibit 4(b):-	First Analysis
Exhibit 5:-	First communication from U.S. Steel regarding high volatile and moderate sulfur content coal
Exhibit 6:-	Second communication from U.S. Steel regarding high volatile and low sulfur content coal
Exhibit 7:-	Pictorial representations of vibrating feeding equipment for handling high temperature material

Calderon DRI Sample : Operation of Apr 28, 03 (72 Hour Test)								
	Drum BCD		**Drum EFG**		**Drum HIJ**		**Drum KLMN**	
	Weight, lb.	%	Weight, lb.	%	Weight, lb.	%	Weight, lb.	%
Uncrushable	40.88	9.60	36.38	9.19	38.3	8.26	115.15	21.99
+1/4 Inch	136.78	32.13	116.31	29.39	159.87	34.50	121.83	23.26
- 1/4 Inch	248.11	58.27	243.05	61.42	265.28	57.24	286.7	54.75
Total	425.77	100.00	395.74	100.00	463.45	100.00	523.68	100.00
	Composite							
	Weight, lb.	%						
Uncrushable	230.71	12.76						
+1/4 Inch	534.79	29.57						
- 1/4 Inch	1043.14	57.68						
Total	1808.64	100.00						
Uncrushable*		*Chemistry Assumed to be that of Feb 18 Test						
Fe Total	95.60	C	0.022					
Fe Met**	95.60	S	0.514					
(**assumed all metallic)								
Drum BCD				**EFG**				
+ 1/4 Inch	+100 Mesh	-100 Mesh	Composite	**+ 1/4 Inch**	+100 Mesh	-100 Mesh	Composite	
%	66.00	34.00	100.00	%	55.20	44.80	100.00	
Fe Total	95.60	64.64	85.07	Fe Total	95.60	64.45	81.64	
Fe Met	95.60	13.86	67.81	Fe Met	95.60	15.29	59.62	
Drum HIJ				**KLMN**				
+ 1/4 Inch	+100 Mesh	-100 Mesh	Composite	**+ 1/4 Inch**	+100 Mesh	-100 Mesh	Composite	
%	52.90	47.10	100.00	%	64.10	33.90	100.00	
Fe Total	95.60	63.64	80.55	Fe Total	95.60	65.35	83.43	
Fe Met	95.60	15.61	57.92	Fe Met	95.60	11.50	65.18	
Composite of All Drums								
+ 1/4 Inch	Fe Total	Fe Met	**% Met**					
	82.60	62.47	**75.63**					

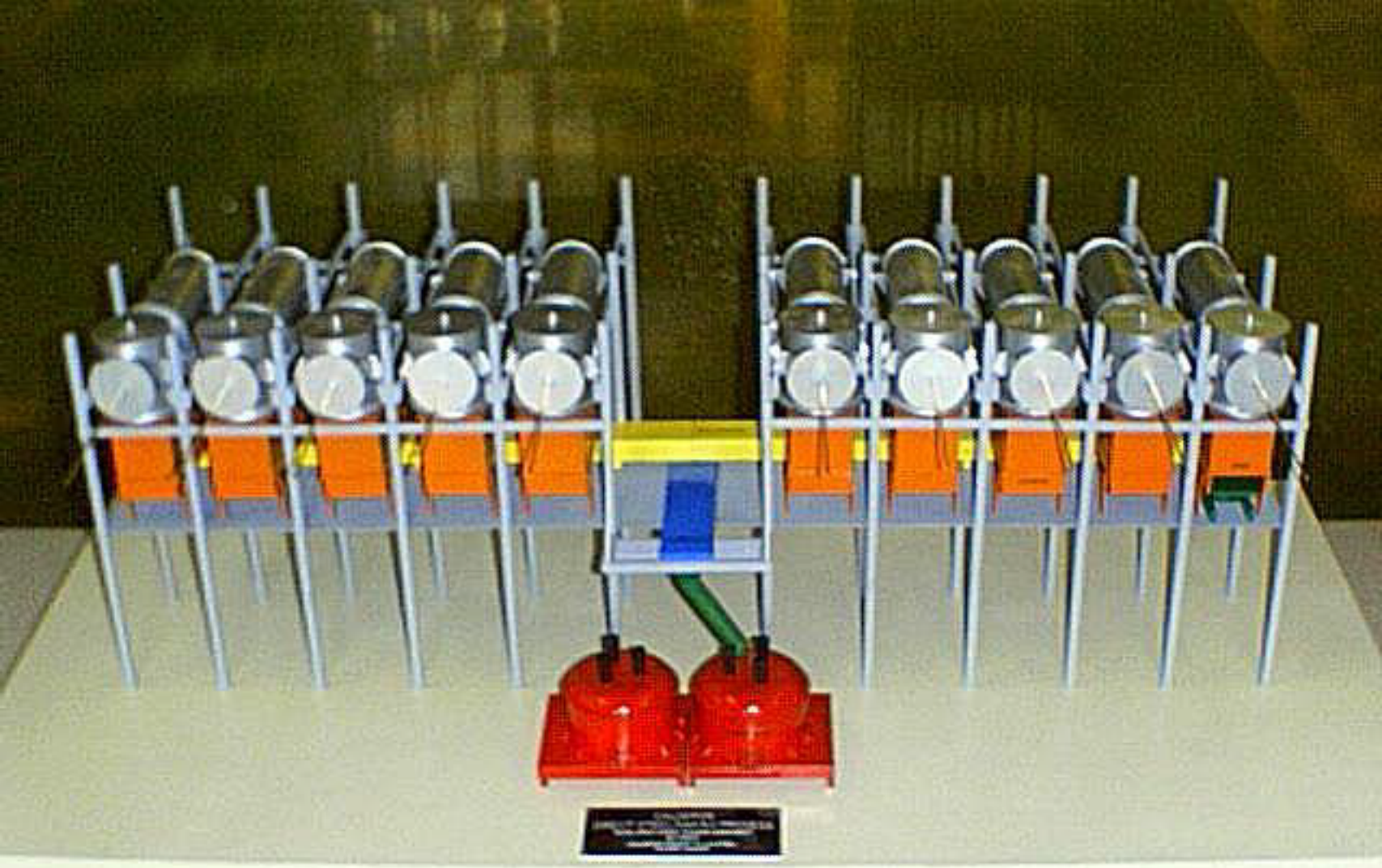
Exhibit 1(a)

Drum BCD				**EFG**				
- 1/4 Inch	+100 Mesh	-100 Mesh	Composite	**- 1/4 Inch**	+100 Mesh	-100 Mesh	Composite	
%	24.00	76.00	100.00	%	19.80	80.20	100.00	
Fe Total	95.60	60.08	68.60	Fe Total	95.60	65.90	71.78	
Fe Met	95.60	29.83	45.61	Fe Met	95.60	32.51	45.00	
Drum HIJ				**KLMN**				
- 1/4 Inch	+100 Mesh	-100 Mesh	Composite	**- 1/4 Inch**	+100 Mesh	-100 Mesh	Composite	
%	31.70	68.30	100.00	%	24.70	75.30	100.00	
Fe Total	95.60	61.44	72.27	Fe Total	95.60	60.93	69.49	
Fe Met	95.60	22.26	45.51	Fe Met	95.60	20.56	39.09	
Composite of All Drums								
- 1/4 Inch	Fe Total	Fe Met	**% Met**					
	70.52	43.65	**61.90**					
Overall								
Drum BCD	Wt. Fraction, %	Fe Total	Fe Met	% Met				
Uncrushable	9.60	95.60	95.60	100.00				
+1/4 Inch	32.13	85.07	67.81	79.71				
- 1/4 Inch	58.27	68.60	45.61	66.49				
Composite	100.00	**76.48**	**57.54**	**75.23**				
Drum EFG	Wt. Fraction, %	Fe Total	Fe Met	% Met				
Uncrushable	9.19	95.60	95.60	100.00				
+1/4 Inch	29.39	81.64	59.62	73.03				
- 1/4 Inch	61.42	71.78	45.00	62.69				
Composite	100.00	**76.87**	**53.95**	**70.18**				
Drum HIJ	Wt. Fraction, %	Fe Total	Fe Met	% Met				
Uncrushable	8.26	95.60	95.60	100.00				
+1/4 Inch	34.50	80.55	57.92	71.91				
- 1/4 Inch	57.24	72.27	45.51	62.97				
Composite	100.00	**77.05**	**53.93**	**69.99**				

Exhibit 1(b)

Drum KLMN	Wt. Fraction, %	Fe Total	Fe Met	% Met				
Uncrushable	21.99	95.60	95.60	100.00				
+1/4 Inch	23.26	83.43	65.18	78.13				
- 1/4 Inch	54.75	69.49	39.09	56.25				
Composite	100.00	**78.47**	**57.59**	**73.38**				
All Drums								
	Wt. Fraction, %	Fe Total	Fe Met	% Met				
Drum BCD	23.54	76.48	57.54	75.24				
Drum EFG	21.88	76.87	53.95	70.18				
Drum HIJ	25.62	77.05	53.93	69.99				
Drum KLMN	28.95	78.47	57.59	73.39				
Overall	100.00	**77.29**	**55.84**	**72.25**				
Feed Chemistries								
	Moisture, %	FeT, %	C, %	S, %				
Composite 6-78	1.60	44.16	27.00	0.395				
6-17	1.77	42.88	30.09	0.319				
18-29	1.14	44.50	28.32	0.342				
30-41	2.08	51.83	19.33	0.453				
42-53	2.42	39.13	33.49	0.618				
54-65	2.27	41.00	31.98	0.317				
66-78	0.97	44.83	27.59	0.275				
Fe Balance								
No. of Pushes	55+70+70+66+50+60+70+70+70+65+70+70+40				**826**			
Blend/Push, lb.	3.50							
Tot Blend, lb	2891.00							
Tot Fe Charged, lb	1256.24	(1.60% Moisture, 44.16% Fet)						
Tot Fe Recovered, lb	1387.90	(Tot Wt. X Fet in Composite)						

Exhibit 1(c)



PHOTOGRAPH #1

USS/USX MINNTAC PLANT
MATERIAL SAFETY DATA SHEET

Health	1 *
Flammability	0
Reactivity	0
Personal Protection	-

HMIS Ratings

*See Section VIII.

1	Health
0	Flammability
0	Reactivity
-	Specific Hazard

NFPA Ratings

NFPA 30B Rating: 1

SECTION I

PRODUCT NAME IRON ORE CONCENTRATES, AND FILTER CAKES	INFORMATION TELEPHONE NO. (218) 749-7401
SUPPLIER USS/USX MINNTAC PLANT	24 HR. EMERGENCY TELEPHONE NO. (218) 749-7406
ADDRESS P.O. BOX 417, MT. IRON, MN 55768	DATE 01-16-1998
HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101) IRON ORE CONCENTRATES, AND FILTER CAKES	
ADDITIONAL HAZARD CLASSES (as applicable) NONE	
CHEMICAL FAMILY IRON ORE	FORMULA MIXTURE

SECTION II - HAZARDOUS INGREDIENTS

CAS REGISTRY NUMBER	%W	CHEMICAL NAME(S)	OSHA PEL	MSHA TLV	Listed as Carcinogen NTP, IARC or OSHA 1910(z) (specify)
1309-37-1	< 65.50	IRON	10 mg/M3 AS Iron Oxide dust and fume.	10 mg/M3 as the fume.	
14808-60-7	< 5.00	SILICA (quartz)	10/(%Silica +2) as Total Respirable Dust	10/(%Silica +2) as Total Respirable Dust	IARC
1305-78-8	< 5.00	CALCIUM OXIDE	5 mg/M3	5 mg/M3	
1309-48-4	< 1.50	MAGNESIUM OXIDE	15 mg/M3 as total particulates	10 mg/M3 as the fume	
1344-28-1	< 1.00	ALUMINUM OXIDE	5 mg/M3 respirable fraction as PNOR*** E	10 mg/M3 as nuisance particulates	
7439-96-5	< .50	MANGANESE	5 mg/M3 (C)* as the fume E	5 mg/M3 (C) *	
13463-67-7	< .030	TITANIUM DIOXIDE	15 mg/M3 as total dust	10 mg/M3 as nuisance particulates	
7446-09-5	< .030	SULFUR	5.0 PPM as sulfur dioxide	5 PPM as sulfur dioxide	
1314-13-2	< .030	ZINC OXIDE	5 mg/M3 as the fume	5 mg/M3 as the fume	

NOTE: All commercial metals contain small amounts of various elements in addition to those specified. These small quantities, frequently referred to as "trace" or "residual" elements, generally originate in the raw materials used. Typical levels of commonly involved trace or residual elements that may be encountered in steel products are provided in Annex I so that their potential hazards may be considered.

NOTE: All exposure limits are based on 8-hour time-weighted average values.
* (C) denotes "Ceiling limit" which should not be exceeded at any time.
** (STEL) denotes "Short Term Exposure Limit" - a 15 minute time weighted average value.
*** PNOR - Particulates Not Otherwise Regulated
E denotes Environmental Hazard (PA)

SECTION III - PHYSICAL DATA

BOILING POINT (Degrees) N.A. F ____ C		SPECIFIC GRAVITY	N.E.	MAXIMUM PERCENT VOC BY WEIGHT (%) % 0 Method used THEORETICAL	
VAPOR PRESSURE @ N.A. F ___C ___mm H ____psi		PERCENT VOLATILE BY VOLUME (%)	0		
VAPOR DENSITY (AIR = 1)	N.A.	EVAPORATION RATE (Butyl Acetate = 1)	N.E.		
SOLUBILITY IN WATER	N.A.	PH =	N.E.	PERCENT SOLID BY WEIGHT (%)	100%
APPEARANCE AND ODOR DARK RED TO BLACK , SOLID					

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N.A. F ____ C	method used	FLAMMABLE LIMITS	LEL N.A.	UEL N.A.
EXTINGUISHING MEDIA N.A.				
SPECIAL FIRE FIGHTING PROCEDURES N.A.				
UNUSUAL FIRE AND EXPLOSION HAZARDS NONE				
WARNING NONE				

N.A. - Not Applicable
N.E. - Not established
N.D. - Not Determined

Exhibit 2

UEC Coal and Coke Laboratory
4000 Tech Center Drive
Monroeville, PA 15146
PHONE: (412) 825-2601 FAX: (412) 825-2727

Final
04/04/2003

Page 1

Report of Test Results

UEC Sample No:	**094420**	Customer:	USS Corporation -Technical Center
Project No:	293	Cust. Purchase Ord. No:	NONE
Work Request No:	02651		
Customer Sample Id:	**Calderon Scrap #24 3/24/03**		

Total Moisture, %	3.45
Proximate Analysis, % (dry)	
Volatile Matter	27.48
Fixed Carbon	65.48
Ash	7.04
Sulfur Content, % (dry)	0.77
Ultimate Analysis, % (dry)	
Carbon	81.25
Hydrogen	4.76
Nitrogen	1.54
Oxygen	4.64
Sulfur	0.77
Ash	7.04
Ash Composition, % (dry)	
SiO2	54.03
Al2O3	28.74
Fe2O3	8.13
TiO2	1.63
CaO	2.01
MgO	0.77
Na2O	0.49
K2O	1.90
P2O5	0.50
SO3	1.67
MnO	0.05
Undetermined	0.08

Sample Preparation by quote

Exhibit 3

CENTRAL FUEL COMPANY

POST OFFICE BOX 165
NEW PHILADELPHIA, OHIO 44663

October 7, 1992

Calderon Energy Company
1400 S. Mahoning Ave.
Alliance, Ohio 44601

I hereby certify that this page together with the attached analysis sheet represents the quality and description of the coal provided to Calderon Energy on October 2, 1992.

Size: 1 1/4" x 3/8"

Seams: Tionesta (3A)
Upper Kittanning (#6)
Middle Kittanning (#5)
Blended to achieve desired quality.

Mine: Central Fuel Company
Stonecreek Mine
County Road 55
New Philadelphia, OH 44663

Keith B. Kimble - President

Witnessed and Officially sealed on this 7th day of October, 1992.

Notary Public
State of Ohio
My commission expires 11/9/96

Exhibit 4(a)

LOAD Nº 4

REAM & HAAGER LABORATORIES

1226 KADERLY STREET NW NEW PHILADELPHIA, OHIO 44663-1297 (216) 343-3711

OCTOBER 06, 1992

LABORATORY NO.: 216327

RECEIVED: OCTOBER 2, 1992

ANALYSIS OF: COAL - 5813 - 10/2/92 - Washed Stoker #6,#3A, & #5 Blend

RECEIVED FROM: CENTRAL FUEL
BOX 165
NEW PHILADELPHIA, OHIO 44663

REPORTED TO: SAME

	AS RECEIVED	DRY
MOISTURE	8.35%	
	5.57%	6.08%
VOLATILE MATTER	38.85%	42.39%
FIXED CARBON	47.23%	51.53%
SULFUR	2.78%	3.03%
HEAT CONTENT	12,617 BTU/lb	13,766 BTU/lb
		14,657 BTU/lb

ASH FUSION DATA

INITIAL DEFORMATION	2026 °F	FREE SWELLING INDEX	(3.0)
SOFTENING (H=W)	2105 °F		
SOFTENING (H=1/2W)	2367 °F	GRINDABILITY INDEX	
FLUID TEMPERATURE	2466 °F		

This is a certified report from Ream & Haager Laboratories
John F. Orlando - President

John F. Orlando

Witnessed and Officially sealed on this 6 day of October, 1992. Notary Public

SUSAN M. LoPRESTI, Notary Public
State of Ohio
My Commission Expires June 24, 1993

Susan M. LoPresti

J. F. Orlando

J. F. ORLANDO

Exhibit 4(b)

LOAD No 4

Maximum potential (SO2) in stack gas = 4.18 lbs/megBTU

From: <DRohaus@uss.com>
To: <acalderon@bghost.net>
Cc: <JSBajaj@uss.com>
Sent: Monday, May 12, 2003 1:21 PM
Subject: Coal

Mr. Calderon,

I checked with UEC about your request for a high vm coal. They probably have some Maple Creek coal that is used at Clairton and has a vm of about 37 to 39 percent. This is probably the highest vm coal used in the USS cokemaking facilities and is also probably the most readily available in the size you requested.

I believe the average vm of the coal we have sent you to date has been less that 30%. A step change of almost 10% in vm should be large enough to determine the impact on the process.

The Maple Creek has a relatively high sulfur content, around 1.5%. The coals we have been sending you have about 0.8% sulfur.

I will check around about a low sulfur coal but in the meantime, I believe UEC can prepare several drums of higher vm coal for delivery sometime next week.

Exhibit 5

From: <DRohaus@uss.com>
To: <acalderon@bghost.net>
Cc: <JSBajaj@uss.com>; <JABurgo@uss.com>
Sent: Friday, June 13, 2003 9:59 AM
Subject: Analysis of Premier Elkhorn

Mr. Calderon,

Below is the basic analysis of Premier Elkhorn coal.

Premier Elkhorn coal:

VM, dry	36.22
VM, daf	38.90
ash	6.89
sulfur	0.86

We can probably get several drums of the coal but it will not be sized (crushed) as the other coals were. The coal is on the ground at Gary. If necessary, we can bring it to UEC here in Monroeville and crush it before shipping it to you.

Are you interested in the coal? How many drums do you want? When do you want them? Do you want the coal crushed?

Please advise and we will try to accommodate.

High Temperature, Hot Fine Materials Conveyor Low Profile Design

High Temperature Low Profile Design Conveyor to handle hot boiler ash for .. Page 1 of

High Temperature Low Profile Design Conveyor to handle hot boiler ash for the lumber industry with special curtains that effectively control the flow of air, contain sparks, and restricts hazardous gas flow. Withstands temperature up to 2300F or 1260C.

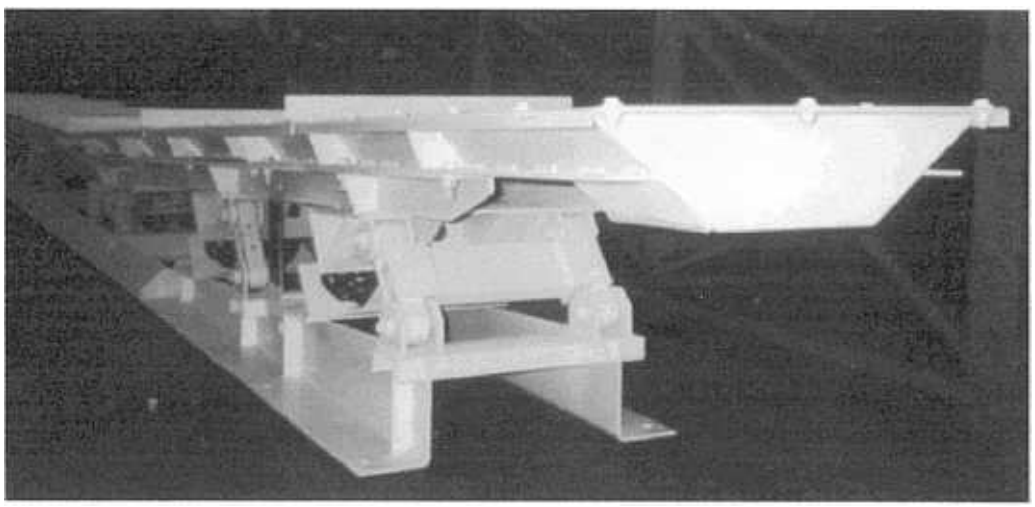


Exhibit 7